n = 7, 6, 5, & 4

NEW COMBINATIONS IN *CROPTILON* (COMPOSITAE-ASTEREAE)

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Hall (1928) in his phylogenetic monograph of *Haplopappus* divided the 16 sections of North America into two series based on involucre shape. Jackson (1966) added an additional section, *Havardia*, based on a species of section *Blepharodon*. Anderson et al (1974) considered Hall's series unnatural and suggested a better grouping based on habit and chromosome numbers; one group (sections *Osbertia, Blepharodon, Havardia, Prionopsis. Isopappus, Oonopsis, Pyrrocoma, Isocoma,* and *Hazardia*) largely herbaceous with base chromosome numbers of $x = 4$, 5, or 6 and the second group (sections *Oreochrysum, Stenotopsis, Stenotus, Tonestus, Macronema, Hesperodoria, Ericameria,* and *Asiris*) largely woody with a base chromosome number of $x = 9$. They also indicated that the monotypic section *Oreochrysum* would be better treated as belonging to *Solidago* (cf. Anderson & Creech, 1975).

Not only is Hall's treatment of *Haplopappus* apparently artificial, it has become increasingly clear that many of the sections of the "sack genus" or "dustbin genus" *Haplopappus* (Correll & Johnston, 1970) represent superficially similar but phyletically unrelated genera. Several species of section *Blepharodon* have been transferred to *Machaeranthera* (Shinners 1950a; Hartman, 1976; Turner & Hartman, 1976) and some to section *Isocoma* (Jackson, 1966). Correll & Johnston (1970) treated sections *Macronema, Ericameria, Prionopsis, Isopappus* (as *Croptilon*), *Isocoma,* and *Blepharodon* (as *Machaeranthera*) as separate genera, and noted the affinities of *Macronema*, *Ericameria*, and the genus *Chrysothamnus*. Urbatsch (1975a, b, 1978), and Urbatsch & Wussow (1979), treated sections *Isocoma* and *Ericameria* as separate genera close to *Chrysothamnus*, transferred both species of section *Stenotopsis* (and therefore the entire section) into *Ericameria*, and noted that a species from *Ericameria* should be transferred to section *Hazardia*. Section *Pyrrocoma* was elevated to generic status by Mayes (1976). Jackson (1978, 1979) has shown genetic affinity between sections *Blepharodon* and *Hazardia*, but section *Hazardia* was treated as a separate genus by Clark (1979). Clark et al. (1980) presented SEM data which indicate no close relationship exists between sections *Pyrrocoma* and *Oonopsis*. Turner & Sanderson (1971) earlier suggested that Hall's "phylogenetic" treatment of *Haplopappus* was "more fiction than fact", and I have come to agree with them.

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My interest is in section *Isopappus*, a section treated as the genus *Croptilon* by Shinners (1951) and Correll & Johnston (1970). My impression earlier (Smith, 1964, 1965, 1966) was that there was no particular reason to split *Isopappus* from *Haplopappus* as *Croptilon*, even though Hall (1928) himself noted that section *Isopappus* was peripheral to this group and "could drop out of the genus without deranging the phylogenetic plan". However, as the dismantling of North American *Haplopappus* has progressed (until now scarcely a skeleton remains), I have become convinced along with those noted above that the proper treatment of section *Isopappus* is at the generic level as the genus *Croptilon*. It deserves this rank at least as much as the several other sections that have been elevated to the rank of genus. I would thus like to propose the following disposition of the five section *Isopappus* taxa in *Croptilon* (synonymy other than that listed is cited in Smith 1965):

1. CROPTILON DIVARICATUM (Nutt.) Raf., Fl. Tellur. 2: 47. 1836.
Chromosome number $n = 4$.

Occuring in sandy areas of the Gulf and Atlantic coasts from central Texas east to Florida and north to southeastern Oklahoma, southern Arkansas, and extreme southern Virginia.

2. CROPTILON **rigidifolium** (E. B. Smith) E. B. Smith, comb. nov.
Haplopappus rigidifolius E. B. Smith, Rhodora 67: 229–230. 1965.
Isopappus divaricatus (Nutt.) T. & G. var. *hirtellus* Shinners, Field & Lab. 18: 157. 1950.

Chromosome number $n = 5$.

Dr. B. L. Turner et al. (U. of Texas at Austin) have provided data (pers. comm. and loan of herbarium material from LL) that show a mixed population of $n = 5$ and $n = 6$ in *C. rigidifolium* from one area (2 mi. E. of Elgin) in Bastrop County, Texas. There is no evident morphological differences between the $n = 5$ and the $n = 6$ individuals in the population; therefore, I assume that the $n = 6$ individuals are carrying a pair of B chromosomes and would thus be $n = 5^{II} + B^{II}$.

Occuring in sandy areas of southern Texas and northeastern Mexico. There is no doubt that this species is different from *C. divaricatum* and not merely a variety of that species (as treated by Shinners). It has a different range, is easily separable morphologically, has a different chromosome number (the chromosomes clearly differ cytologically from those of *C. divaricatum*), and will not even hybridize with *C. divaricatum* (Smith, 1965, 1966).

3. CROPTILON HOOKERIANUM (T. & G.) House, N.Y. State Mus. Bul. 223–234: 61. 1921. var. HOOKERIANUM

Chromosome number $n = 6$.

One population (southeast of La Grange in Fayette County, Texas) of this variety is known to be consistently $n = 7$. The individuals of the population are not distinguishable morphologically from normal $n = 6$ individuals of var. *hookerianum*; thus, the population is assumed to be carrying a stable pair of B chromosomes, and could be represented as $n = 6^{II} + B^{II}$.

Occuring on gravelly roadsides, endemic to southern Texas. While I did not explicitly say so, I earlier was of the opinion (Smith, 1965) that since Shinners (1950b, 1951) and Waterfall (1960) were using the epithet "hookerianum (-us)" for *both* the $n = 5$ taxon from Kansas/Oklahoma/northern Texas (here treated as *C. hookerianum* var. *validum*) and the $n = 6$ taxon from southern Texas (here treated as *C. hookerianum* var. *hookerianum*), that the name was a source of confusion and should be rejected. I adopted the next earliest name in *Haplopappus* and treated this and the next two taxa at the subspecies level under *H. validus*. In the intervening 16 years since my earlier publication, I have come to recognize that "hookerianum" is the proper epithet for the species, and now prefer the category variety for the infraspecific variation in *C. hookerianum*.

4. CROPTILON HOOKERIANUM (T. & G.) House var. **validum** (Rydb.) E. B. Smith, comb. nov.

Isopappus validus Rydb., Brittonia 1: 100–101. 1931.

Chromosome number $n = 5$.

Some individuals of this variety also carry B chromosome (Smith, 1965).

Occuring in sandy soil from central Kansas to northern Texas (a few exceptional populations along the Arkansas River in Arkaansas).

5. CROPTILON HOOKERIANUM (T. & G.) House var. **graniticum** (E. B. Smith) E. B. Smith, comb. nov.

Haplopappus validus (Rydb.) Cory subsp. *graniticus* E. B. Smith, Rhodora 67: 236. 1965.

Croptilon divaricatum (Nutt.) Raf. var. *graniticum* (E. B. Smith) Shinners, Sida 3: 348. 1969.

Chromosome number $n = 7$.

Some individuals of this variety also carry B chromosomes.

Occuring on thin sandy soil over grantic outcrops in the Central Mineral Region of Texas (endemic). An exceptional population southeast of La Grange in Fayette County, Texas was mentioned earlier in this paper (and in Smith, 1965); it probably represents *C. hookerianum* var. *hookerianum* with a stable pair of B chromosomes. Cytogenetic information supporting the recognition of each of the three varieties of *C. hookerianum* was published earlier (Smith. 1965, 1966).

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